SECTION 15450 - POTABLE-WATER STORAGE TANK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Steel, nonpressure, potable-water storage tank.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Surface water-storage tank, including structural reinforcement and foundation, shall be capable of withstanding the effects of dead and live gravity loads and winds of 145 mph.

B. Seismic Performance: Tank shall withstand the effects of earthquake motions determined according to ASCE 7-05.

   1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

C. Thermal Movements: Water-storage tank, including structural reinforcement and foundation, shall allow for thermal movements resulting from the maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

   1. Temperature Change (Range): 110 deg F ambient, 180 deg F material surfaces.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the water storage tank.
   2. Include rated capacities, operating characteristics, and furnished specialties and accessories.

B. Tank Interior Finish: For each paint system specified. Include all primers, liners and finishes.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
4. MSDS for each product used.

C. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details for each water-storage tank, including the following:

1. Tank, roof, and shell openings.
2. Plans, elevations, sections, details, and attachments to other work.
3. Structural analysis and calculations signed and sealed by the qualified professional engineer responsible for their preparation.

D. Welding certificates.

E. Qualification Data: For fabricator.

F. Seismic Qualification Certificates: For steel water storage tank, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

G. Product Certificates: For each type of potable-water storage tank, from manufacturer.

H. Source quality-control reports.

I. Purging and disinfecting reports.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Employ a qualified structural engineer to prepare calculations, Shop Drawings, and other structural data for fabrication and erection of surface water-storage tank.

1. Engineering Responsibility: Preparation of data for surface water-storage tank, accessories, specified appurtenances, and concrete supports and foundations, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code--Steel."

2. AWS D1.3, "Structural Welding Code--Sheet Steel."

C. Pipe Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

D. Comply with NSF 61, "Drinking Water System Components - Health Effects," for potable-water storage tank. Include appropriate NSF marking.

1.6 COORDINATION

A. Coordinate size and location of foundation with actual equipment provided.

PART 2 - PRODUCTS

2.1 STEEL, NONPRESSURE, POTABLE-WATER STORAGE TANK

A. Basis-of-Design Product: Subject to compliance with requirements, provide Horizontal 2000 gallon 64 inch diameter BDH tank by Highland Tank and Mfg. Co or equivalent.

B. Description: Steel, cylindrical horizontal nonpressure-rated tank with plate end caps.

C. Fabricate supports and attachments to tank with reinforcement strong enough to resist tank movement during design load events when tank supports are anchored to the foundation.

D. Construction: Steel, constructed with nontoxic welded joints.

E. Manhole: Watertight, for tank more than 36 inches in diameter

F. Tappings: Factory-fabricated steel, welded to tank.

1. NPS 2” and Smaller: ASME B16.5, flanged
2. NPS 2-1/2” and Larger: ASME B16.5, flanged.

G. Specialties and Accessories: Include tappings in the tank and the following:

1. Goose neck type free air vent with 316 stainless steel insect screen. Screen to have maximum opening size of 0.043”.
2. Gage glass, brass fittings, compression stops, and gage-glass guard.
3. 2” interstitial monitor pipe with flanged top.

H. Horizontal Tank Supports: Factory-fabricated steel saddles, welded to tank before testing and labeling.

2.2 PAINT MATERIALS

A. Paint: Comply with AWWA D102.

B. Tank Shell Interior Finish: Two component polyurethane lining complying with NSF 61. Extend lining into and through tank fittings and outlets. Interior lining is to be continuous and extend beyond the sealing surface of all flange connections. Primer to comply with liner application guidelines.

C. Tank Shell Exterior Intermediate Paint: Acrylic polyurethane paint compatible with prime and finish paints. Intermediate coat shall have a slight color contrast with finish coat.

D. Tank Shell Exterior Finish Paint: Factory acrylic polyurethane coating according to AWWA D103. Color: White

2.3 SOURCE QUALITY CONTROL

A. Test and inspect potable-water storage tank according to the following tests and inspections and prepare test reports:

1. Pressure Testing for Potable-Water Storage Tank: Hydrostatically test to ensure structural integrity and freedom from leaks at pressure of 5 psig. Fill tank with water, vent air, pressurize tank, disconnect test equipment, hold pressure for two hours with no drop in pressure, and check for leaks.

B. Repair or replace tank that fail test with new tank, and repeat until test is satisfactory.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install water storage tank on concrete foundation, level and plumb, firmly anchored. Arrange so devices needing servicing are accessible.

B. Anchor tank supports and tank to foundation.

C. Install the following devices on tank where indicated:

1. Tank vent on nonpressure tank.
2. Connections to accessories.

D. After installing tank with factory finish, inspect finishes and repair damages to finishes.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to potable-water storage tank to allow service and maintenance.

C. Connect water piping to water storage tank with flanges and with shutoff valves. Connect tank drains with shutoff valves and discharge at grade beyond tank foundation. All shut off valves shall be flanged ball valves connected directly to tank flanges.

1. Valves are specified in Section 15110 - Valves

a. Valves NPS 4”and Smaller: Ball.
b. Valves NPS 6” and Larger: Butterfly.
c. Drain Valves: Flanged NPS 3/4“ ball valve.

2. Water Piping Connections: Make connections to dissimilar metals with dielectric fittings.

3.3 FIELD QUALITY CONTROL

A. Perform the following final checks before filling:

1. Test operation of tank accessories and devices.
2. Verify that tank vent is clear and operating correctly.

B. Filling Procedures: Follow manufacturer's written procedures. Fill tank with water to operating level.

3.4 CLEANING

A. Clean and disinfect potable-water storage tank.

B. Use purging and disinfecting procedure described in AWWA C652 or as described below:

1. Purge water storage tank with potable water.
2. Disinfect tank by one of the following methods:

a. Fill tank with water-chlorine solution containing at least 50 ppm of chlorine. Isolate tank and allow to stand for 24 hours.
b. Fill tank with water-chlorine solution containing at least 200 ppm of chlorine. Isolate tank and allow to stand for three hours.

3. Flush tank, after required standing time, with clean, potable water until chlorine levels are not present at levels higher than the standard domestic supply.
4. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination made by authorities having jurisdiction shows evidence of contamination.

C. Prepare written reports for purging and disinfecting activities.

END OF SECTION 15450